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October 24, 2003

Mr. Nabil S. Fayoumi
U. S. Environmental Protection Agency - Region 5
Superfund Division
77 West Jackson Boulevard (SR-6J)
Chicago, Illinois 60604-3590

Re: Slurry Wall Spoils Generation
Groundwater Migration Control System
Sauget Area 2 – Sites O, Q, R And S
Sauget, Illinois

Dear Mr. Fayoumi:

At a recent site meeting, Solutia was requested to prepare a current estimate of the volume of spoil material likely to be generated by construction of the slurry wall for the Groundwater Migration Control System at the Sauget Area 2 Site R. This letter presents that estimate, based on the currently known site conditions.

In Section 4.4.1 of the revised Prefinal Design submitted to you on July 3, 2003, it was noted that the design allowed for a maximum of 20,000 cubic yards of spoil, consisting of excavated soil, bentonite slurry, and excess or spilled backfill mix. It was also noted that the actual volume of spoil was expected to 10,000 cubic yards or less. Our current expectations are that the actual volume will be closer to the design estimate of 20,000 cubic yards, primarily because of the need to add imported clay soil to decrease the permeability of the in situ materials and because of the inability to use the fly ash, boulders, and landfilled materials recently encountered at the site for backfill. The various sources of spoil are described below.

- **Excavated Soil**

  The dry density of the backfill will be less than the density of the in situ soil because of the addition of bentonite slurry. This bulking effect results in an excess of excavated material at the end of construction and that excess material will be placed in the temporary spoil stockpile. The estimated volume of this portion of the stockpile remains unchanged from its original value of 3,000 to 5,000 cubic yards, based on discussion with the slurry wall contractor, Inquip Associates.

- **Solidified Slurry**

  Some slurry will be left over at the end of construction. The volume of the surplus material will be minimized by careful construction staging; however, Inquip estimates that there will be a surplus of between 3,000 and 5,000 cubic yards of slurry at the end of the project, corresponding to a trench length of between 200 and 300 feet. This slurry will be mixed with a solidifying agent, probably cement, and placed in the temporary spoil stockpile.

- **Surplus Spoil Resulting From Use of Clay Borrow**

  Laboratory tests carried out for backfill mix design purposes demonstrate that the site soils are not capable of reliably providing a backfill that will satisfying the specified permeability of 1×10^{-7} cm/sec. Accordingly, the site soils will have to be supplemented with a low permeability material. The most likely supplement will be imported low permeability clay soil. Preliminary tests carried out with samples from one potential borrow pit indicate that between 10 and 15 percent clay will have to be added to the backfill to satisfy the specified permeability. The actual percentage will depend on the characteristics of the specific clay borrow source (plasticity, fines content, and clay fraction). This will result in an equal volume of backfill being surplus to the trench requirements.

  The total volume of soil to be excavated for the barrier wall is approximately 55,000 cubic yards. Consequently, addition of 10 to 15 percent clay borrow will result in approximately 5,500 and 8,500 cu. yd. of surplus soil that will have to be placed in the temporary spoil stockpile.

- **Unsuitable Excavated Materials**

  During pre-excavation along the slurry trench alignment, thick deposits of fly ash were discovered in the southern half of the site. The deposits extend for approximately 900 feet northward from the southwestern corner of the barrier wall alignment and are approximately 22 feet deep, on average. The ash cannot be used for backfill because of the light weight and spherical shape of the grains. Consequently, it must be placed in the temporary spoil stockpile. The estimated volume of ash is 2,500 cu. yd., assuming a 3.5 ft. wide trench.

  Other materials encountered at the site that cannot be used as backfill include large cobbles and boulders that are present immediately above bedrock and landfilled materials that appear to be present in Site Q along the entire alignment of the southern arm of the barrier wall. Based on review of the logs of borings put down at the site, as well as on site specific experience over the past several weeks, it is estimated that cobbles and boulders may be encountered along at least 50 percent of the trench alignment in a zone approximately 5 feet thick, on average. This will result in a spoil volume of approximately 1,000 cu. yd.

Landfilled materials were encountered in Site Q along the wall alignment while excavating exploratory test pits. The materials are primarily rubber goods (tire carcasses and inner tubes, O-ring gaskets) and are unsuitable for use as backfill. The refuse appears to extend through the depth investigated and it is anticipated that the average thickness of landfilled materials will be approximately 20 feet, resulting in a likely spoil volume of about 1,500 cu. yd.

- **Spilled backfill and Spoil From Site Cleanup**

  At the end of construction, there will be spilled slurry and backfill along the wall alignment that will have to be cleaned up. These materials will be scraped from the site and placed in the spoil stockpile. It is estimated that the volume of such materials will be relatively small, in the range of 1,000 to 2,000 cu. yd.

In summary, therefore, it is expected that the total spoil volume placed in the temporary stockpile will be in the range of 17,500 to 25,500 cu. yd., as follows:

Surplus excavated material	3,000 to 5,000 cu. yd.
Solidified slurry	3,000 to 5,000 cu. yd.
Spoil resulting from use of imported clay	5,500 to 8,500 cu. yd.
Unsuitable excavated material	5,000 cu. yd.
Spill and clean up materials	1,000 to 2,000 cu. yd.
Total Spoil Volume	17,500 to 25,500 cu. yd.

It is emphasized that this volume is still appreciably less than the 30,000 to 40,000 cu. yd. of spoil that would have been generated by the use of jet grouting construction techniques. It is also noted that 60 percent or more of the expected spoil volume results from site specific conditions that were not anticipated during the design. Finally, it must be understood that some of the volume estimates are based on experience with other projects on other sites. Consequently, specific site conditions may continue to result in the actual volumes being different from the estimated quantities presented in this letter.

If you have any questions about this letter, or wish to discus the details of the estimates, please do not hesitate to call me.

Sincerely,

Solutia Inc.

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Project Coordinator

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